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ST8050

AT Command Set Guide

ST8050 AT001

ST8050

AT Command Set Guide

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Revision

Revision	Date	Author	Description of change
	09/14/2012	Esteban Proano	Initial Release
1.00	02/12/2013	Ramiro Sanchez	Add even type codes
2.00	4/6/2013	Carla Jones	Grammar corrections
3.0	1/21/2014	Humberto Hernandez	New report protocol and command
3.1	03/30/2014	Nguyen Bui	Updating to firmware version 1.3
3.2	03/31/2014	Ramiro Sanchez	Added description of the fields in AT&ST DEVSTATUS command

Introduction

The ST8050 is a tracking device with the capability to report over GPRS and Iridium satellite networks. The designated purpose is to use GPRS to report where this service is available. In places where GPRS is not accessible the device automatically switches to the Iridium network and continues to report normally.

Protocols

The ST8050 has two protocols formats, the ASCII format and the Binary format. The ASCII format is human readable, but it uses much more bandwidth to be transmitted. The binary protocol is more efficient in terms of size, but it is not human readable. Both protocols have the same parameters all of which are integer types except latitude and longitude which are float point types:

Report Protocol

Parameter	Size in bits	Description
Start of message	8	Start message character "$", only via GPRS
Size	8	Bytes included in the message except 'Start of message', 'Size', 'End of message' bytes. It is in binary.
Header	8	Protocol version 2, '2': Report message via GPRS 3, '3': Report message via Satellite
IMEI	56	Unique device identifier, only via GPRS.

Mask	8	Identifies which data is embedded in this report, each bit indicates a parameter, if the bit has the value '1' the parameter is present if the value is '0' the parameter is not present. Bit Mask: Bit 0 – Location Data Bit 1 – Telemetry data Bit 2 – Digital Ports Bit 3 – Analog Ports Value Bit 4 – Signal Strength Bit 5 – GSM Network Information Bit 6 – GSM SIMCARD information Bit 7 – Alarm information If the parameter is not present in this mask it must be ignored when decoding the report.
Day	5	Day read from GPS
Month	4	Month read from GPS
Year	5	Year read from GPS minus 2012
Hour	5	Hour read from GPS
Minute	6	Minute read from GPS
Second	6	Second read from GPS
Location Data		
Latitude Signal	1	0 – Positive, 1 – Negative
Latitude	27	Latitude component from the device coordinate. In binary format the latitude must be divided by 1.000.000
Longitude Signal	1	0 – Positive, 1 – Negative
Longitude	28	Longitude component from the device coordinate In binary format the longitude must be divided by 1.000.000
Speed	8	Speed in Km/h
Direction	7	Bearing of the device in degrees divided by 3
GPS Valid	1	Indicate if the GPS had a fix position at the moment of the report. 1 – Fixed position 0 – Not fixed position
Telemetry Information		

<table>
<tr><td>Altitude</td><td>13</td><td>Altitude in meter in relation to ocean level</td></tr>
<tr><td>Odometer</td><td>20</td><td>Distance in meters since traveled by the device.</td></tr>
<tr><td>Battery Level</td><td>8</td><td>Level of the battery in Voltage.</td></tr>
<tr><td colspan="3">Alarm Information</td></tr>
<tr><td>Event Type</td><td>8</td><td>This parameter will represent the predefined events that our device will handle. Here are the values assigned for each type of event.
<table>
<tr><td></td><td>ID</td></tr>
<tr><td>Periodic Report</td><td>0</td></tr>
<tr><td>Locate</td><td>1</td></tr>
</table>
<table>
<tr><td>Digital Ports</td><td>ID when High</td><td>ID when Low</td></tr>
<tr><td>0</td><td>10</td><td>20</td></tr>
<tr><td>1</td><td>11</td><td>21</td></tr>
<tr><td>2</td><td>12</td><td>22</td></tr>
<tr><td>3</td><td>13</td><td>23</td></tr>
<tr><td>4</td><td>14</td><td>24</td></tr>
<tr><td>5</td><td>15</td><td>25</td></tr>
<tr><td>6</td><td>16</td><td>26</td></tr>
<tr><td>7</td><td>17</td><td>27</td></tr>
</table>
<table>
<tr><td>Analog Ports</td><td>ID when High</td><td>ID when Low</td></tr>
<tr><td>1</td><td>30</td><td>31</td></tr>
<tr><td>2</td><td>32</td><td>33</td></tr>
</table>
<table>
<tr><td rowspan="2">Speed</td><td>ID Underspeed</td><td>ID Overspeed</td></tr>
<tr><td>18</td><td>19</td></tr>
</table>
<table>
<tr><td>Geofence</td><td>Enter</td><td>Leave</td></tr>
<tr><td></td><td>40</td><td>41</td></tr>
</table>
</td></tr>
</table>

Event Parameter	5	This Parameter will only be included when it is a Geofence event and it will contain the Geofence ID. This ID will change on the command and should only support a number as big as 2^5
DigitalPort Status		
Digital port Status	8	Each bit represents the status of a digital port, bit '0' represents the port '1' and the bit '7' represents the port '8'. If the bit has value '1' it means that the port is active.
Analog Port Value		
Analog port 1	12	Value read in the analog port 1. Valid range 0 to 4095.
Analog port 2	12	Value read in the analog port 2. Valid range 0 to 4095.
GSM Signal Strength		
GSM Signal Strength	5	Value from 0 to 30 representing the GSM signal strength.
Iridium Signal Strength	3	Value from 0 to 5 representing the Iridium signal strength.
GSM Network Information		
MCC	10	Operator MCC
MNC	10	Operator MNC
LAC	16	Cell tower LAC
CELLID	16	Cell tower ID
GSM SIMCARD Information		
SIMCARD serial number	64	Serial number of the SIMCARD
Position ID		
Position Sequence Number	8	Position sequence number, range 0 to 255. This information is NOT included in reports with alarm.
End message	8	Message ends with character "#"

Note: Now you can receive multiple messages in one UDP package.

Table 1

a. ASCII Protocol

All parameters are separated by ',' character and the line terminated by the character '#'.

Ex.: $/2,300234030001220,127,18,12,1,15,13,51,25.802357,-80.331570,0,85,1,12,120,14,0,2615,2634,15,0,310,260,29371,15203,**8901260760005535682**,217#

Example of multiple messages:
$‡2,300234030001220,255,2,1,2,19,55,43,25.802122,-80.332252,0,114,1,7,83,14,0,0,2612,2631,12,0,310,260,29371,15203,8901260760005535682,51#$‡2,300234030001220,255,2,1,2,19,56,43,25.802132,-80.332253,0,114,1,7,83,14,0,0,2612,2631,14,0,310,260,29371,15203,8901260760005535682,52#

b. Binary protocol

This protocol is a sequence of bytes that should be treated as a big number where the user must extract the information following its order on the packet and the size in bits of each parameter as described in the table 1. If the parameter has 3 bits, it means that only 3 bits must be read regardless of its position inside an individual byte. A parameter can begin on a byte and ends on another or be entirely inside a unique byte. The protocol was designed like this to use all available bits of data to send the information generating a compact transmission format.

Keep Alive Protocol

Parameter	Size in bits	Description
Start of message	8	Start message character "$", only via GPRS
Size	8	Bytes included in the message except 'Start of message', 'Size', 'End of message' bytes. It is in binary.
Header	8	0, '0': Keep Alive message via GPRS 1, '1': Keep Alive message via Satellite
IMEI	56	Unique device identifier, only via GPRS
End of message	8	End message character '#', only via GPRS

Table 2

Buffered Messages

The ST8050 stores the messages generated in moments where there are no GPRS and Iridium signals. The current ST8050 buffer capacity using ASCII up to 1500 messages, depending on how big messages are. The device will store up to 4000 messages with binary, up to 500 SMS messages depending on the size of the messages.

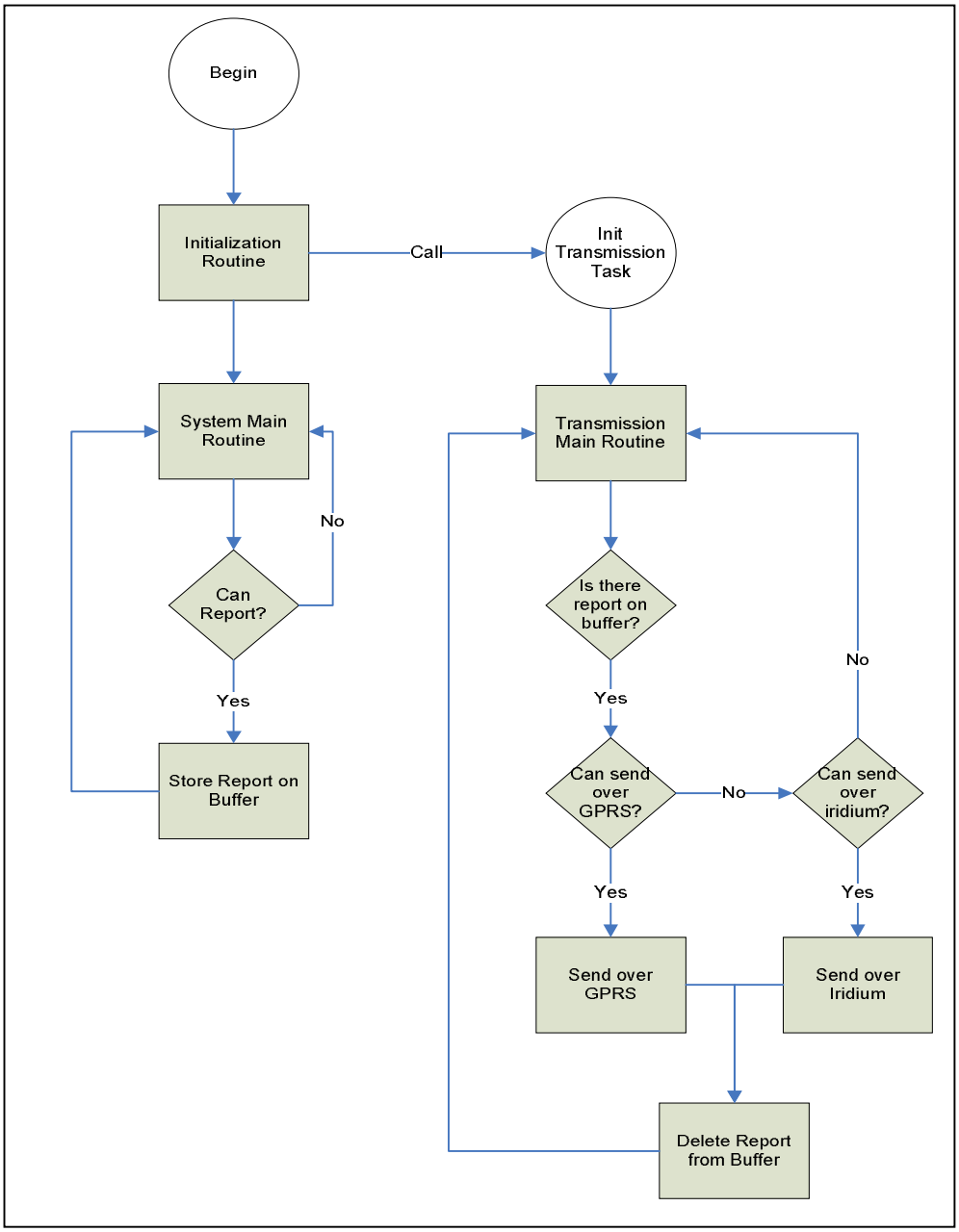
The buffered messages are stored respective of the time and distance interval configured for the Iridium channel by the STREPORT command.

Messages will be sending via satellite when the device cannot communicate via GPRS network. While sending message with Iridium (satellite), the following rule will be applied:

- Event messages will be sent first
- Periodic report message generated by satellite modem will be sent when there are not event messages in the buffer
- Periodic report messages generated prior to out of coverage will be stored in buffer until the device get back to GPRS coverage. At that time, messages are pushed to server in the following ways:
    - One by one if ability to send by batch is disabled
    - By batch (500 bytes/package ~= 9 messages) if ability to send by batch is enabled

Operational Sequence

The ST8050 has the capability to manage two different communication channels, the GPRS channel which operates over cellular network and the Iridium channel which uses a satellite network to send/receive data. The ST8050's main feature is to use both channels to report as if it never loses the signal. For the end user this process must be as transparent as possible. The following flow diagram that illustrates how ST8050 executes this process:



Report Flow Diagram

Commands

Standard AT Commands

The user can send these commands and get the responses via SMS, GPRS, Iridium or Serial Port.

The following is the format in which all commands will be presented:

AT&xxxxx(Command)	Xxxxx (Command Description)
Command Function	(Description of the command function)
Command Format Query	AT&x=?
Response	AT&x: (parameter1 name 1 – 15), (parameter2 name 1-10),...
Write Format	AT&x=<value>,<value>[,<optional value>],...
Response	OK or ERROR
Read Format	AT&x?
Response	<value>,<value>,...
Execution Format	AT&x
Response	OK, ERROR, or <value>
Parameter Values	
<Value 1>	AT&x: (1-15),(1-10)
<Value 2>	
Notes	(Additional command notes)
Examples	

Response Message Format

Via SMS

Parameter	Description
Header	'A'
IMEI	Unique device identifier
Response	Command's response

Via GPRS (UDP/TCP)

Parameter	Description
Start of message	Start message character "$"
Size	Bytes are included in the message except 'Start of message', 'Size', 'End of message' bytes.
Header	'A'
IMEI	Unique device identifier
Response	Command's response
End of message	End message character '#'

Via Satellite

Parameter	Description
Size	Bytes are included in the message except this byte.
Header	'B'
Response	Command's response

There are two kinds of commands:

1. Read/Write commands
2. Execution commands

For serial port communication the user has to include a space between AT&ST and the command, ex; For GPRS send the command AT&STGPRS, for Serial port send the command AT&ST GPRS

READ/WRITE COMMANDS

AT&STGPRS – GPRS parameters

AT&ST GPRS	GPRS parameters
Command Function	This command configures the parameters used by the ST8050 to communicate over the GPRS channel.
Write Format	AT&ST GPRS=<apn>,'<user>','<password>',<protocol>,<ip>, <port>
Response	OK:STGPRS=<apn>,'<user>','<password>',<protocol>, <ip>, <port>
Read Format	AT&ST GPRS?
Response	OK:STGPRS=<apn>,'<user>','<password>',<protocol>,<ip>, <port>
Execution Format	N/A
Response	N/A
Parameter Values	
<apn>	GPRS APN provided by the telecom operator
<user>	GPRS username provided by the cellular operator
<password>	GPRS Password provided by the cellular operator
<protocol>	Transport protocol used to communicate with the server. 0: TCP 1: UDP
<ip>	The server hostname or IP address. Ex.: xyz.com or 000.000.000.000
<port>	The server port which the ST8050 must connect.
Notes	The <user> and <password> must be between single quotes (')

AT&STREPORT – Periodic Report

AT&STREPORT	Periodic Report
Command Function	This command defines the rules the ST8050 must use to know when, how and what to report.
Write Format	AT&STREPORT=<mode>,<format>, <GPRS mask>, <Iridium mask>, <GPRS time On>, < GPRS time Off>, <Iridium time ON>, <Iridium time Off>, <GPRS distance>, <Iridium distance>
Response	OK:STREPORT=<mode>,<format>, <GPRS mask>, <Iridium mask>, <GPRS time On>, < GPRS time Off>, <Iridium time ON>, <Iridium time Off>, <GPRS distance>, <Iridium distance>
Read Format	AT&STREPORT?
Response	OK:STREPORT=<mode>,<format>, <GPRS mask>, <Iridium mask>, <GPRS time On>, < GPRS time Off>, <Iridium time ON>, <Iridium time Off>, <GPRS distance>, <Iridium distance>
Parameter Values	
<mode>	Report mode indicates what condition must be used to report: 0: Time condition 1: Distance condition 2: Time or distance condition
<format>	Indicates how the protocol must be formatted to be transmitted. 0: Binary 1: ASCII

AT&STREPORT	Periodic Report
<GPRS mask>	Indicates which parameters will be embedded in the report, this parameter is a numerical value in which each bit represents a parameter as indicated by the following bit mask: Bit 0 – Location Data Bit 1 – Digital Port Status Bit 2 –Analog Ports Value Bit 3 – GSM Strength Bit 4 – Iridium Strength Bit 5 – GSM Network Information Bit 6 – GSM SIMCARD information Bit 7 – Used by the ST8050 to indicate that an alarm was triggered.
<Iridium mask>	Same as GPRS Mask
<GPRS time On>	This parameter indicates the time interval in seconds that the unit must report if the Digital port 1 level is high and the GPRS modem has signal. 0 – Disable the report in this condition. Range: 20 to 65535 seconds
<GPRS time Off>	This parameter indicates the time interval in seconds that the unit must report if the Digital port 1 level is low and the GPRS modem has signal. 0 – Disable the report in this condition. Range: 20 to 65535 seconds
<Iridium time On>	This parameter indicates the time interval in seconds that the unit must report if the Digital port 1 level is high and the GPRS modem has no signal or disabled. 0 – Disable the report in this condition. Range: 60 – 65535 seconds
<Iridium time Off>	This parameter indicates the time interval in seconds that the unit must report if the Digital port 1 level is low and the GPRS modem has no signal or disabled. 0 – Disable the report in this condition. Range: 60 – 65535 seconds
<GPRS distance>	This parameter indicates the distance interval in meters that the unit must move before report. 0 – Disable the report in this condition. Range: 0 – 65535 x 100 meters

AT&STREPORT	Periodic Report
<Iridium distance>	This parameter indicates the distance interval in meters that the unit must move before report. 0 – Disable the report in this condition. Range: 0 – 65535 x 100 meters
Notes	If all counters defined for Iridium communication are equal 0, the Iridium communication will be disabled.

AT&STDIOALARM – Digital Port Alarm

AT&STDIOALARM	Digital Port Alarm
Command Function	This command creates alarms using the digital input ports as triggers. When the conditions are met the alarms are triggered and the device executes the routine defined by this command.
Write Format	AT&STDIOALARM=<port id>,<trigger type>, <condition>, <min duration>
Response	OK:STANALARM=<port id>,<trigger type>, <condition>, <min duration>
Read Format	AT&STDIOALARM?=<port id>
Response	OK:STANALARM=<port id>,<trigger type>, <condition>, <min duration>
Parameter Values	
Port ID	Id of the port where the trigger will be created. Range: 1 to 8
Trigger Type	Define the type of the trigger 0: Disable 1: Report immediately after the condition is met. 2: Execute a time counter while the condition is met.
Condition	Define the condition to trigger the alarm. 0: When the port level goes UP. 1: When the port level goes DOWN. 2: When the port level changes, UP or DOWN, this condition is not valid if the trigger type is 2.
Minimum duration	Indicates the time that the condition must be in valid state before trigger the alarm. Value in seconds. Range: 0 to 255
Notes	The periodic report counter is reset after each report, if the condition still valid a new counting is initiated.

AT&STANALARM – Analog Port Alarm

AT&STANALARM	Analog Port Alarm
Command Function	This command creates alarms using the analog input ports as triggers. When the conditions are met, the alarms are triggered and the device executes the routine defined by this command.
Write Format	AT&STANAALARM=<port id>,<min value>, <max value>, <min duration>, <trigger type>
Response	OK:STANALARM=<port id>,<min value>, <max value>, <min duration>, <trigger type>
Read Format	AT&STANALARM?=<port id>
Response	OK:STANALARM=<port id>,<min value>, <max value>, <min duration>, <trigger type>
Parameter Values	
<port id>	Id of the port where the trigger will be created. ID 1: Analog port 1 ID 2: Analog port 2 ID 3: Speed, this alarm can be used to define the speed limit. Range: 1 to 3
<min value>	Lower limit of the range considered normal. If the value read from the port is lower than this limit, the alarm is triggered. Range: 0 to 4095
<max value>	Upper limit of the range considered normal. If the value read from the port is greater than this limit, the alarm is triggered. Range: 0 to 4095
<min duration>	I Indicates the time that the condition must be in valid state before trigger the alarm. Value in seconds. Range: 0 to 255
<trigger type>	Define the type of the trigger 0: Disable 1: Report immediately after the condition is met. 2: Execute a time counter while the condition is met.

AT&STANALARM	Analog Port Alarm
Notes	

AT&STODOMRST – Set Odometer

AT&STODOMRTS	Set Odometer
Command Function	This command resets the odometer to a specified value in meters.
Write Format	AT&STODOMRST=<odometer>
Response	OK:STODOMRST=<odometer>
Read Format	AT&STODOMRST?
Response	OK:STODOMRST=<odometer>
Parameter Values	
<odometer>	Value in meters which the odometer will be reset to.
Notes	

AT&STSATSENDMODE – Sending in batch of Iridium

AT&STSATSENDMODE	Sending in batch of Iridium
Command Function	This command will allow you to enable/disable sending in batch using Iridium communication.
Write Format	AT&STSATSENDMODE=<state>
Response	OK:STSATSENDMODE=<state>
Read Format	AT&STSATSENDMODE?
Response	OK:STSATSENDMODE=<state>
Parameter Values	
<state>	Mode of Iridium communication 0 – disable batching sending by Iridium 1 – enable batching sending by Iridium
Notes	

AT&STGEOFENCE – Set Geofence

AT&STGEOFENCE	Set Geofence
Command Function	This command creates landmarks which the ST8050 will use as geo-fence, meaning that a report will be sent every time the ST8050 enters or leaves these landmarks.
Write Format	AT&STGEOFENCE=<clear>, <geo id>, <mode>, <radius>, <latitude>, <longitude>
Response	OK:STGEOFENCE=<geo id>, <mode>, <radius>, <latitude>, <longitude>
Read Format	AT&STGEOFENCE?=<geo id>
Response	OK:STGEOFENCE=<geo id>, <mode>, <radius>, <latitude>, <longitude>
Parameter Values	
<clear>	This parameter indicates if the ST8050 must delete all previous geo-fences stored into its memory before saving the new ones. Will NOT delete the previous geo-fences. Will delete the previous geo-fence. Only when this parameter is sent with the value 1, will all the geo-fence records be deleted and the memory cleared.
<geo id>	The ID of the landmark is set by the user, it will be sent on the report when the device enters or leaves the geo-fence and can be used by the server to identify which landmark the device is entering or leaving. Range 0 to 224.
<mode>	Indicates what must happen for the device to report. Enter the geo-fence Leave the geo-fence Enter of Leave the geo-fence
<radius>	Radius in meters which coordinates with the geo-fence circular region.
<latitude>	Latitude of the center of the geo-fence
<longitude>	Longitude of the center of the geo-fence
Notes	The ST8050 supports up to 5 geo-fences to be embedded in the same command, if this is the case the user must continue to fill the line with the information of the following points. The extra register must not have the “Clear Store Geo-Fence” parameter.

Execution Commands

AT&STRESET – Device Reset

AT&STRESET	Device Reset
Command Function	This command resets the device.
Execution Format	AT&STRESET ?
Response	OK:STRESET
Parameter Values	
Notes	

AT&STRELAY – Set Relay State

AT&STRELAY	Set Relay State
Command Function	This command sets the state of the ST8050 internal relays
Execution Format	AT&STRELAY=<Relay ID>,<state>
Response	OK:STRELAY=<Relay ID>
Parameter Values	
<Relay ID>	Id of the relay. 0 – Pin SW_UBATT0 1 – Pin SW_GND0 2 – Pin SW_UBATT1 3 – Pin SW_GND1 Range: 0 to 3
<state>	Indicates the level the port must assume. 0: Open 1: Close
Notes	

AT&STLOCATE – Locate Now

AT&STLOCATE	Locate now
Command Function	This command is used to get the current location of the device.
Execution Format	AT&STLOCATE
Response	OK:STLOCATE
Parameter Values	
Notes	If this command is sent using the programming serial port, the current location will be sent through the GPRS network. If it can not get the valid position, then it will send the last known valid position

AT&STFIRMWOTA – Firmware Upgrade by Air

AT&STFIRMWOTA	Firmware upgrad via OTA
Command Function	This command updates the firmware of the device over the air
Execution Format	AT&STFIRMWOTA=<server>, <port>, <file>, <user>, <pwd>
Response	OK:STFIRMWOTA
Parameter Values	
<server>	IP of the FTP server. Only IP is accepted.
<port>	FTP server TCP port
<file>	Full path to the firmware file in the FTP server.
<user>	FTP server username
<pwd>	FTP server password
Notes	In order to execute the command successfully a FTP server IP, user name, password and path to the new firmware file to be downloaded by the device is required. After the download, the device installs the new firmware and reboots in to order to activate it. The download of the firmware is made via GPRS channel only

AT&STCLEARLOG – Clear buffer

AT&STCLEARLOG	Clear Buffer
Command Function	This command deletes all messages saved in the buffer
Execution Format	AT&STCLEARLOG
Response	OK:STCLEARLOG
Parameter Values	
Notes	

AT&STAPPVER – Version of flash file system

AT&STAPPVER	Version of ST8050 and firmware
Command Function	This command returns the version of ST8050 and firmware
Execution Format	AT&STAPPVER?
Response	OK:STAPPVER=<ST8050 version>,<SAT version>
Parameter Values	
<ST8050 version>	Version of ST8050 firmware
<QUAKE version>	Version of QUAKE version

AT&STDEVSTATUS – Device Status

AT&ST DEVSTATUS	Device Status
Command Function	This command show the device information
Write Format	N/A
Response	N/A
Read Format	N/A
Response	N/A
Execution Format	AT&ST DEVSTATUS
Response	OK:STDEVSTATUS=FRM:<frm version>,APP:<app version>,Time:<date>,IMEI:<imei>,GPRS:<gprs status>,SMS:<gsm status>,UDP:<udp status>,IRI:<iridium status>,GPS:<gps status>,GSM_SIG: <gsm sq>, IRI_SIG:<iridium sq>,MSGS:<buffer status>,FHS:<fhs>
Parameter Values	
<frm version>	Version of the foundation.
<app version>	Version of the application
<date>	Current date and time (format: ddmmmyy hh:mm:ss)
<imei>	Unique device identifier
<gprs status>	Status of the GPRS connection: REG_UNKNOWN NOT_REG_SEARCHING REG_ON_HOME REG_ROAMING
<gsm status>	Status of the GSM connection: REG_UNKNOWN: NOT_REG_SEARCHING REG_ON_HOME REG_ROAMING
<udp status>	Status of the UDP connection: TRUE: Registered to a network and has IP. FALSE: : using TCP/IP

<iridium status>	Status of the Iridium connection: UNKNOWN NOT_REGISTERED REGISTERED
<gps status>	GPS status: 0: Device does not get valid position 1: Deice gets a valid position
<gsm sq>	GSM signal quality
<Iridium sq>	Iridium signal quality
<buffer status>	Number of the messages and command stored in the buffer. a/b/c/d a: number of message in waiting list b: number of message in the list c: number of command messages d: number of response messages
<fhs>	Size of the buffer
Notes	Example: OK:STDEVSTATUS=FRM:2.32.20609.11259,APP:1.3,Time:26March14 12:33:07,IMEI:300234030108150,GPRS:REG_ON_HOME_NET,SMS:REG_ON_HOME_NET,UDP:TRUE,IRI:NOT_REGISTERED,GPS:0,GSM_SIG:27,IRI_SIG:0,MSGS:0/0/0/0,FHS:401424

Appendix

ST8050 Connector Description

The ST8050 connector has 40 connector pins. Each pin has the following function:

Pin	Signal	Type	Voltage (Min/Max/ Nominal) VDC	Notes
1	**UBATT (+)**	Power	6/32/12	
2	**UBATT (+)**	Power	6/32/12	
3	**UBATT (-)**	Ground		
4	**UBATT (-)**	Ground		
5	**3V5_500MA**	Continuous Output	+/- 1%@650mA	Used to pull the digital input port signal to high
6	**3V5_500MA**	Continuous Output	+/- 1%@650mA	Used to pull the digital input port signal to high
7	**NOT USED**			
8	**NOT USED**			
9	**NOT USED**			
10	**NOT USED**			
11	**GND**	Ground		
12	**NOT USED**			
13	**MTS_RXD_RS232**	Output		Serial Port RX
14	**NOT USED**			
15	**MTS_TXD_RS232**	Input		Serial Port TX
16	**MTS_DSR_RS232**	Output		Serial Port DSR
17	**MTS_DTR_RS232**	Input	6/32	Serial Port DTR
18	**MTS_DCD_RS232**	Output		Serial Port DCD
19	**GND**	Ground		
20	**LOG_TXD_RS232**	Input		
21	**GND**	Ground		
22	**LOG_RXD_RS232**	Output		
23	**CANH**	Input/Output		CAN High signal
24	**CANL**	Input/Output		CAN Low signal
25	**SW_UBATT_0**	Output	UBATT(+)/1A@25C	Switched Relay
26	**SW_GND_0**	Output	GND/1A@25C	Switched Relay
27	**SW_UBATT_1**	Output	UBATT(+)/1A@25C	Switched Relay
28	**SW_GND_1**	Output	GND/1A@25C	Switched Relay
29	**ANA1**	Input	0-3.5	Analog port 1
30	**GND**	Ground		

31	**ANA2**	Input	0-3.5	Analog port 2
32	**DIG_1**	Input	3.5V CMOS/TTL	Used to monitor the vehicle ignition state
33	**DIG_2**	Input	3.5V CMOS/TTL	Used to monitor the SOS button
34	**DIG_3**	Input	3.5V CMOS/TTL	
35	**DIG_4**	Input	3.5V CMOS/TTL	
36	**DIG_5**	Input	3.5V CMOS/TTL	
37	**DIG_6**	Input	3.5V CMOS/TTL	
38	**DIG_7**	Input	3.5V CMOS/TTL	
39	**DIG_8**	Input	3.5V CMOS/TTL	
40	**GND**	Ground